Abstract Submitted
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Analysis of Fuel Injection and Atomization of a Hybrid Air-Blast Atomizer.[1] PETER MA, LUCAS ESCLAPE, Stanford University, TIMO BUSCHHAGEN, SAMEER NAIK, JAY GORE, ROBERT LUCHT, Purdue University, MATTHIAS IHME, Stanford University — Fuel injection and atomization are of direct importance to the design of injector systems in aviation gas turbine engines. Primary and secondary breakup processes have significant influence on the drop-size distribution, fuel deposition, and flame stabilization, thereby directly affecting fuel conversion, combustion stability, and emission formation. The lack of predictive modeling capabilities for the reliable characterization of primary and secondary breakup mechanisms is still one of the main issues in improving injector systems. In this study, an unstructured Volume-of-Fluid method was used in conjunction with a Lagrangian-spray framework to conduct high-fidelity simulations of the breakup and atomization processes in a realistic gas turbine hybrid air blast atomizer. Results for injection with JP-8 aviation fuel are presented and compared to available experimental data.

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